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GIPSY MOTH AND BROWN-TAIL MOTH INVESTIGATIONS

A. F. Burgess, Entomologist in Charge

On March 3, 1923, S. S. Crossman and R. T. Webber sailed from New York to study the natural enemies of the gipsy moth, *Porthetria dispar* L., in Europe, with a view of introducing into the United States parasites of this insect which are not already established here. During the same month, Dr. J. N. Summers sailed for Japan on a similar project.

France, Spain, Italy, Germany, Austria, Hungary, Roumania, and Poland were visited, where consultations were held with prominent entomologists. In addition favorable forest areas were scouted in an attempt to locate *Porthetria dispar* infestations. The first four countries had been thoroughly scouted the previous year by Mr. Crossman, so that this year it was not necessary to rescout much of this area.

A heavy gipsy moth infestation was found in Spain, and medium infestations were located in Hungary and Roumania. Very light infestations were found in Poland, France, Italy, and Germany, but no *dispar* were seen in Austria.

At Debreczen, Hungary, which is about 200 miles east of Budapest, a medium to heavy gipsy moth infestation was found which seemed to offer the best possibilities for parasite study. Accordingly arrangements were made for the use of a small brick building near the forest for an insectary. Through the kindness of Dr. G. Horvath of the National Museum at Budapest, the services of one of his assistants, J. Ujhelyi, were obtained. A few more than 100,000 gipsy moth larvae were collected, from which were recovered and sent or brought to America 36,978 tachinid puparia. Of these, 27,248 are *Parasetigena segregata* Rond., a species which has a single generation each year.

In Europe this species is also recorded as a parasite of *Lymantria monacha* L. and *Lophyrus pini* L. The puparia have been examined at the Gipsy Moth Laboratory and placed in hibernation. It is estimated that at least 50 per cent of the puparia are in excellent condition, and the establishment of this species in America seems very probable.

Next in abundance to *Parasetigena segregata* are 9,148 puparia of what appears to be *Blepharipa scutellata* R. D., a species which has a single generation each year. This species is already well established in America, but the puparia were saved for colonization.

The remaining 582 tachinids are summer-issuing species, all of which have several recorded European hosts and which require alternate hosts for their establishment. The species involved are *Tachina larvarum* L., *Carcelia gnava* Meig., *Lydella nigripes* Fall, *Zenillia libatrix* Panz, *Sturmia gilva* Hartig, and *Compsilura concinnata* Meig. The last-named species is already well established in America, and it is likely that some of the other species can be established when sufficient individuals can be obtained in Europe.

Biological studies of these summer-issuing species of the tachinids received at Melrose Highlands are being made, but at present it seems doubtful if enough breeding work can be done with the species on hand to result in enough individuals to make a satisfactory colony.

In addition to the tachinid parasites of Porthetria dispar, 2,400 cocoons of Apanteles fulvipes Hal. were received at Melrose Highlands from Hungary, from which 220 living adults were obtained.

In Japan attempts were made to continue the investigations on parasitism of the gipsy moth which were begun the previous year.

Infestations of Porthetria dispar in Japan are usually very local, often being confined to two or three ornamental trees, and are therefore difficult to locate. Such local outbreaks are apparently of short duration, as all of the infestations used for study last year were almost entirely devoid of larvae this summer.

Owing to an excessively rainy season, lasting from the first of May until about the middle of July, it was not possible to perform very much work in the field. Disease was prevalent and several times collections of dispar larvae were killed off before they could be packed for shipment. One lot of 860 larvae was sent early in the season, and from these 250 cocoons of Apanteles fulvipes Hal. were obtained.

Rearing work is in progress with the Apanteles adults received from Europe and Japan, and as a result 7,000 Apanteles fulvipes have been liberated this season.

FOREST INSECT INVESTIGATIONS

T. E. Snyder, Entomologist Acting in Charge

J. E. Patterson left Ashland, Oreg., July 26, for an extended trip in the Sierra regions of California. The pine defoliator (Coloradia pandora Blake) was discovered in the Chiquito Basin. The infestation is evidently very light, since no trees could be found that had been noticeably defoliated. The caterpillars were found on the ground under trees, where they had evidently been brought down by the smoke and gases from the control fires. This discovery is interesting, as the species has not before been reported for this locality. On July 14, Mr. Patterson arrived in the Yosemite National Park to study the present forest insect conditions in this Park. Bark-beetle infestations in the yellow pine, sugar pine, and Jeffrey pine have been very light since the last examinations made in the Park in 1919. The pine defoliator, Coloradia pandora Blake, was also found in the Park. Caterpillars were found feeding on the Jeffrey pine in the Little Yosemite and in the Snow Creek Basin. They were found on the yellow pine on the Yosemite Valley floor.

Dr. H. E. Burke reports that the Forest Insect Laboratory at Palo Alto, Calif., is cooperating with the California State Department of Agriculture in an exhibit for the State Fair at Sacramento. The laboratory furnishes the specimens of the shade-tree insects, their work and photographs, and the State exhibits them in connection with its regular exhibit. The exhibit goes from the State Fair to various county and other fairs, so that it will be working for us most of the time.

At San Francisco a number of fine imported Chamaecyparis and Retinospora were affected with dying twigs, and the nurserymen were afraid that the entire trees would die. The trees are especially valuable at this time because the quarantine regulations now forbid their importation. The cause of the trouble was found to be the Monterey cypress bark-beetle, *Phloeosinus cupressi* Hopk. The beetles bore into the small twigs, possibly for food, and this causes the twig to break over thd lose color. Usually not much real damage is done, but the tree looks badly for a while.

The tops of numerous poplars on an estate near Redwood City, Calif., have been killed by the Pacific flatheaded poplar girdler, *Agrilus nevadensis* Horn. The beetles which originally caused the trouble appear to have come from the native black cottonwoods along the banks of the creeks. Cutting out and burning the infested wood was recommended for control.

J. M. Miller reports that last season it was discovered on the Arrowhead Lake Project, Calif., that submergence of the logs in water for several days was not an effective method of killing Ips beetles. This season some experiments are under way at North Fork to determine whether prolonged submergence will result in effective mortality. These tests, which include both Ips and *Dendroctonus brevicomis* Lec., are being carried out by Mr. Wagner. They have now been under way for a month and so far the experimenters have not succeeded in drowning any beetles. Broods of *D. brevicomis* came out of the water in fine condition after three weeks' submergence. They apparently become dormant while in the water and do not develop but recover and resume activity within a few hours after they are brought into the air.

Mr. Edmonston and Mr. Hofer are camped at Bright Angel, on the north rim of the Grand Canyon, engaged in an examination of the 17,000 acres treated last season. The purpose of this survey is to determine the results of last season's work and to formulate plans for next season.

J. C. Evenden states that a reexamination of the dying fir and spruce in the Yellowstone National Park was made and a large number of larvae were collected and mailed to the Coeur d'Alene, Idaho, station for rearing. These have emerged and are the spruce budworm, *Cacoecia fumiferana* Clem., as determined by Mr. Heinrich. The epidemic in the Park is apparently spreading and a great deal of damage will be done unless it is reduced by natural agencies. There was a serious infestation in the lodgepole pine some few years ago by the mountain pine beetle, but very little new work was recorded.

An examination of the dying alpine fir in the Glacier National Park was made during the past month. The trees are being killed by a small bark-beetle, *Dryocoetes* sp. This attack occurred in the top, and each year a lower portion of the bole is attacked. As many as four years are required to kill some of the larger trees. In many cases smaller trees are killed in one year. During the latter part of August a further examination will be made of this damage, with the purpose of recommending control measures of some sort, if possible.

BEE CULTURE INVESTIGATIONS

E. F. Phillips, Apiculturist in Charge

Four members of the staff of the Bee Culture Office attended the Fifth Annual Conference of the Wisconsin State Beekeepers' Association at the University of Wisconsin, Madison, Wis., August 13 to 17. They were Dr. E. F. Phillips, Dr. A. P. Sturtevant, E. L. Sechrist, and W. J. Nolan. Harold J. Clay, of the Bureau of Agricultural Economics, was present and issued the Honey Market News Report for August 15 from Madison. Dr. S. A. Jones, also of the Bureau of Agricultural Economics, was present during part of the meetings. Several men associated with State work in beekeeping were also present, including R. B. Willson, agent of the Bee Culture Laboratory in New York State, Dr. M. C. Tanquary, State Entomologist of Texas, Prof. J. J. Davis, State Entomologist of Indiana, E. C. Davis, State Beekeeping Specialist of Louisiana, and Chas. A. Reese, State Apiary Inspector of Ohio. Prof. H. F. Wilson, of the University of Wisconsin, presided at all the meetings.

The series of meetings including the dedication of the Miller Memorial Apicultural Library at the University of Wisconsin and the dedication of the memorial tablet at Marengo, Ill., on August 18 was one of the most successful and interesting ever held in the United States. There was a registration of about 300, which would make a total actual attendance of more nearly 500.

L. M. Bertholf, assistant bacteriologist, has resigned to resume his position as instructor of biology at the North Carolina College for Women, Greensboro, N. C.

SOUTHERN FIELD-CROP INSECT INVESTIGATIONS

J. L. Webb, Entomologist Acting in Charge

The cotton caterpillar appeared in large numbers soon after the middle of August in the various isolated cotton regions in western Texas and New Mexico. These include Presidio, El Paso, Hudspeth, Pecos, Ward, and Reeves Counties in Texas, and Dona Ana and Eddy Counties in New Mexico. The invasion seems to have been the strongest which has ever reached that part of the country.

For the last two or three years there have been increasing complaints from southern Texas about the damage to cotton by the so-called cotton flea. The insect to which this name is applied is *Psallus seriatus*. The injury attributed to it is the blasting of the very young squares at the terminal bud of the plant. Some preliminary observations made this season throw strong doubt on whether this insect is responsible for the damage attributed to it. A number of plants caged in such a manner as to exclude the insect developed typical injury. The plants showing the excessive shedding of the very small squares also show an abnormal habit of growth. They become very tall and have few or no lateral branches and practically no fruit. All varietal characteristics are masked by this abnormal

growth. This suggests that a large part of the injury charged to the insect may be due to climatic causes.

T. C. Barber, stationed at Brownsville, Tex., recently made a trip to Uvalde, Tex., for conference with J. C. Hamlin of the Australian Prickly Pear Commission.

R. H. Van Zwaluwenburg, formerly with this Bureau, has been collecting parasites of the sugar-cane moth borer near Vera Cruz. Mexico, for release on the sugar properties at Los Mochis, Sinaloa, Mexico.

L. L. Benton, W. C. Gideon, J. G. Lewis, G. E. Hawkins, and K. M. Mace of the boll weevil force resigned during the month.

George A. Maloney, of the boll weevil force, visited Washington August 4 to consult with the Chief of the Bureau.

TRUCK-CROP INSECT INVESTIGATIONS

J. E. Graf, Entomologist Acting in Charge

N. F. Howard recently returned to his headquarters at Birmingham, Ala., after a trip to Kentucky, southern Ohio, and Indiana. While on this journey he succeeded in finding the Mexican bean beetle in the four counties of Scioto, Pike, Highland, and Adams in Ohio. Mr. Howard has the following to say regarding this infestation: "The beetle was very hard to find and had undoubtedly reached there only a short time previously in most instances. Near Otway in Scioto County I found all stages of the beetle and newly emerged adults and empty pupa cases, indicating that the insect had been there at least five weeks. At other places it appeared as though it had only been present a very short time." The species has also been reported from Russell County in Virginia.

The summer inspection for the sweet-potato weevil in Baker County, Fla., and Charlton County, Ga., has just been finished and the present findings indicate that very successful progress has been made in this work. More complete results will be obtained during fall inspection, but the weevil has apparently been eradicated in the worst danger centers and it is expected that no unusual difficulty will be experienced in cleaning up the remaining infestations.

C. E. Smith reports that considerable injury has been done to corn in Louisiana by the belted cucumber beetle, Diabrotica balteata Lec. This insect in destroying the silk of the corn ear has retarded pollination, and in some fields a large number of poorly developed ears was noted. Similar injury has previously been noted as being caused by the beetle of the western corn rootworm, D. longicornis Say, but this is the first instance where such injury has been found to be due to the attack of D. balteata.

FRUIT INSECT INVESTIGATIONS

A. L. Quaintance, Entomologist in Charge

O. I. Snapp, in charge of the Bureau's laboratory at Fort Valley, Ga., made an address before the Macon County Georgia Peach Growers' Association at Montezuma, Ga., on July 25, and at a peach growers' barbecue at Fort Valley, Ga., on July 31.

E. J. Newcomer attended the sixth annual meeting of the Northwestern Association of Horticulturists, Entomologists, and Plant Pathologists, at Boise, Idaho, July 23-26. A number of valuable papers were presented, and field trips were made to neighboring orchards and to the entomological field station of the Idaho Experiment Station at Parma, Idaho, where experimental work is being done in controlling the leaf-roller and the alfalfa weevil.

Fred E. Brooks of the French Creek, W. Va., station spent the week of August 12 collecting insect rearing material and investigating insect injury to native nuts in the vicinities of Oakland, Md., and Weston, W. Va. In both localities the branches and twigs of hazel, Corylus americana, killed by larvae of one or more species of Agrilus, were a conspicuous form of injury.

In the vicinity of French Creek, W. Va., many small trees of black walnut, hickory, hazel, and chestnut were partially defoliated during July and August by beetles of Anomala marginata Fab. In some cases, especially on black walnut, the beetles were very abundant and young trees were stripped of their leaves.

H. S. Adair, a graduate of the Mississippi Agricultural College, has been appointed Junior Entomologist and assigned to duty at Thomasville, Ga., where he will be associated with John B. Gill in connection with pecan insect investigations.

CEREAL AND FORAGE INSECT INVESTIGATIONS

W. R. Walton, Entomologist in Charge

Prof. George A. Dean, Professor of Entomology in the Kansas Agricultural College and Entomologist of the Agricultural Experiment Station, has been appointed Entomologist in charge of Cereal and Forage Insect Investigations, to assume his duties in the Bureau September 1. Acting on the advice of his physicians, Mr. Walton found it necessary to give up the heavy work connected with the administration of this office and has taken leave in order to recuperate in health.

Professor Dean will devote considerable time this fall to visiting the various field laboratories engaged in cereal and forage insect investigations and will give special attention to corn borer operations, the grasshopper situation, Hessian fly work, etc.

MISCELLANEOUS

(Items from the National Museum contributed by S. A. Rohwer)

Paul Myers, of Cereal and Forage Insect Investigations, stationed at Carlisle, Pa., visited the Division of Insects recently to consult with Mr. Gahan regarding a paper on the parasites of the Hessian fly.

T. R. Chamberlin, who has spent the last two years at Hyères, France, investigating parasites of the alfalfa weevil, visited the Museum to consult with Messrs. Gahan and Cushman before he returns to his permanent station at Salt Lake City, Utah.

Miss Margaret M. Fagan, of Cereal and Forage Insect Investigations, stationed at Salt Lake City, Utah, has spent about two weeks at the Museum preparing a bibliography of the alfalfa weevil.

Specimens of a large robber fly, Saropogon dispar Coq., have been sent to Doctor Aldrich by David Hunter of San Antonio, Tex., with the information that they are killing many honeybees in his apiary, "having weakened the colonies to a considerable extent before the cause was discovered ... Over a thousand have been killed by knocking them over with a stick." No such numbers have ever been reported before, although in the literature of robber flies there are records of several species occasionally attacking bees. Saropogon dispar has been found hitherto only in Texas and Oklahoma, and no referencesto its habits are found in literature.

Doctor Böving has spent considerable time on the morphology and taxonomy of some of the larvae of the family Scarabaeidae, and has recently finished figures and descriptions of most of the genera of the subfamilies Rutelinae and Dynastinae. He has also recently completed descriptions and figures of the larvae of Clinidium sculptile, belonging to the ancient and taxonomically important family Rhyssodidae.

Included in a collection of ants recently received from Prof S. C. Bruner, of Cuba, were five species of the remarkable and rare genus Macromischa. Three of these species are new and will be described by Doctor Mann.

Recent letters from Prof. T. D. A. Cockerell, who has been spending the summer in Siberia, report very interesting and extensive collections of Cerambycidae and Buprestidae and many small beetles, as well as a good lot of butterflies, many crane-flies and a very fine-looking lot of sawflies. He states that he has collected a good many bees, but they are very ordinary looking species, some apparently the same as the European forms. He records the collection of a few fossil insects and describes briefly a camp in the woods where he was "consumed" by mosquitoes and horse-flies.

Messrs. Hyslop and Böving are working on the morphology and taxonomy of the larvae of the family Elateridae, and are arranging the material in the collection.

George Greene, of Philadelphia, has spent several days in the library of the Museum verifying references for his catalogue of Coleoptera.

R. A. St. George has recently completed an arrangement of the larvae belonging to the families Alleculidae and Tenebrionidae. Mr. St. George has done this work under the general direction of Doctor Böving, and reports that the National Collection now contains representatives of 6 genera and 9 species belonging to the family Alleculidae, and 65 genera and 104 species belonging to the family Tenebrionidae. Much of the material belonging to these two families has not been reared, and in many instances specific identifications have not been verified. J. S. Wade, of the Office of Cereal and Forage Insect Investigations, has deposited considerable valuable material, most of which belongs to the genera Eleodes and Embaphion. The nucleus for the collection in these two families was made years ago by H. G. Hubbard and E. A. Schwarz, but since then notable additions have been made by H. S. Barber, and others have been secured from various offices of the Bureau. It is hoped that various field men will collect and rear material belonging to these families.

LIBRARY

Mabel Colcord, Librarian

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